

Liebert® RX™ Remote Distribution Cabinet

User Manual



TABLE OF CONTENTS

IMPORTANT SAFETY INSTRUCTIONS	1
1.0 INSTALLATION	2
1.1 Unpacking and Preliminary Inspection	2
1.2 Handling Considerations	2
1.3 Unit Preparation	4
1.4 Location Considerations	4
1.5 Configurations for Liebert RX Installation	5
1.5.1 Configuration 1—Single Unit	5
1.5.2 Configuration 2—Back-to-Back	6
1.5.3 Configuration 3—Side-By-Side	6
1.5.4 Configuration 4—Three Units	7
1.5.5 Configuration 5—Four Units	7
1.6 Power Wiring	8
1.6.1 Input Power Connections	8
1.7 Output Power Connections	14
1.8 Current Plus Monitoring—Optional	14
1.8.1 Summary Alarm	15
1.9 Liebert LDMF™ Monitoring—Optional	15
1.9.1 Replacing a CT in the CT Module	16
1.10 Liebert LDMF Communication	18
1.10.1 LDMF Setup Port Connection	18
1.10.2 Liebert SiteScan® Web Monitoring Interface	19
1.10.3 Summary Alarm	19
2.0 EQUIPMENT INSPECTION AND STARTUP	20
2.1 Internal Inspection	20
2.2 Startup	20
3.0 INSPECTION AND STARTUP CHECKLIST	21
3.1 Inspection	21
3.2 Startup	22
3.3 Monitoring System Check Out	22
4.0 OPERATING INSTRUCTIONS	23
4.1 Startup Procedures	23
4.2 Normal System Shutdown	23
4.3 Normal System Turn ON	23
4.4 Current Plus Monitoring—Optional	24
4.5 Liebert LDMF™—Optional	25
5.0 MAINTENANCE	26
5.1 Repair	26
5.2 Inspection & Cleaning	26
5.2.1 Inspection Schedule	26

FIGURES

Figure 1	Typical cabinet and floor planning dimension data	3
Figure 2	Configuration 2 and Configuration 3—Two Liebert RX units	6
Figure 3	Configuration 4—Three units and Configuration 5—Four units.	7
Figure 4	Input electrical field connection location for units with main panelboard breaker	9
Figure 5	Input electrical field connection location for units without main panelboard breaker.	10
Figure 6	Electrical field connections for units with LDMF monitoring	11
Figure 7	Electrical field connection for units with Current Plus Monitoring.	12
Figure 8	Liebert LDMF™, Liebert SiteScan® and Liebert IntelliSlot® location and connection details	13
Figure 9	Current Plus Monitoring adapter board electrical field connections.	15
Figure 10	Electrical field connections for CT Module replacement CTs.	17
Figure 11	Electrical field connections for Liebert LDMF™ summary alarm	18
Figure 12	Liebert LDMF local display	25

TABLES

Table 1	Maximum wire range recommended torque values	20
---------	--	----

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation of the Liebert RX. Read this manual thoroughly, paying special attention to the sections that apply to your installation, before installing or operating the Liebert RX. Retain this manual for use by installing personnel.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the Liebert RX or preparing the unit for installation.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires.

Extreme caution is required when performing installation and maintenance.

Special safety precautions are required for procedures involving handling, installation and maintenance of the Liebert RX. Observe all safety precautions in this manual before handling or installing the unit. Observe all precautions in this manual before as well as during performance of all maintenance procedures.



WARNING

Risk of electric shock. May cause personal injury or death.

Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.

Equipment inspection and startup should be performed only by properly trained and qualified personnel wearing appropriate safety headgear, gloves and shoes. Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup.

Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Liebert RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.



WARNING

Risk of electric shock. May cause personal injury or death.

Lethal voltages exist within the equipment during operation. Observe all warnings and cautions in this manual. Failure to comply may result in serious injury or death. Obtain qualified service for this equipment as instructed. All power wiring should be installed by licensed electricians and must comply with the NEC and applicable codes.



WARNING

Risk of heavy unit falling or tipping over. Improper handling can cause equipment damage, injury or death.

The unit should NOT be loosened from the shipping pallet until after all handling by forklift or pallet jack is completed. Exercise extreme care when handling Liebert RX cabinets to avoid equipment damage or injury to personnel.

ELECTROMAGNETIC COMPATIBILITY—The Liebert RX complies with the limits for a Class A Digital Device, pursuant to Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Operating this device in a residential area is likely to cause harmful interference that users must correct at their own expense.

The Liebert RX complies with the requirements of EMC Directive 2004/108/EC and the published technical standards. Continued compliance requires installation in accordance with these instructions and use of accessories approved by Emerson.

1.0 INSTALLATION



NOTE

Read this entire manual before installing and operating the system. Upon receipt of a Liebert RX, the installer should perform the following steps to ensure a top-quality installation.

1.1 Unpacking and Preliminary Inspection

A top-quality installation begins on the receiving dock.

- Inspect the shipment for damage or signs of mishandling before unpacking the unit(s).
- Check Shock-Watch™ indicator.
- Unpackage the unit carefully. Use care to avoid puncturing the container with sharp objects that would damage the contents.
- Remove the packing and vapor barriers and inspect the equipment for any obvious shipping damage.



WARNING

Risk of heavy unit falling over. Improper handling can cause equipment damage, injury or death.

The unit should NOT be loosened from the shipping pallet until after all handling by forklift or pallet jack is completed. Exercise extreme care when handling Liebert RX cabinets to avoid equipment damage or injury to personnel.

1.2 Handling Considerations

The Liebert RX is bolted to a wooden pallet to allow handling by a forklift, pallet jack or similar equipment.

Check size and weight—Refer to the cabinet drawings furnished with the unit for size and weight information. Typical cabinet dimensions and weights are shown in **Figures 1** and **1.3**.

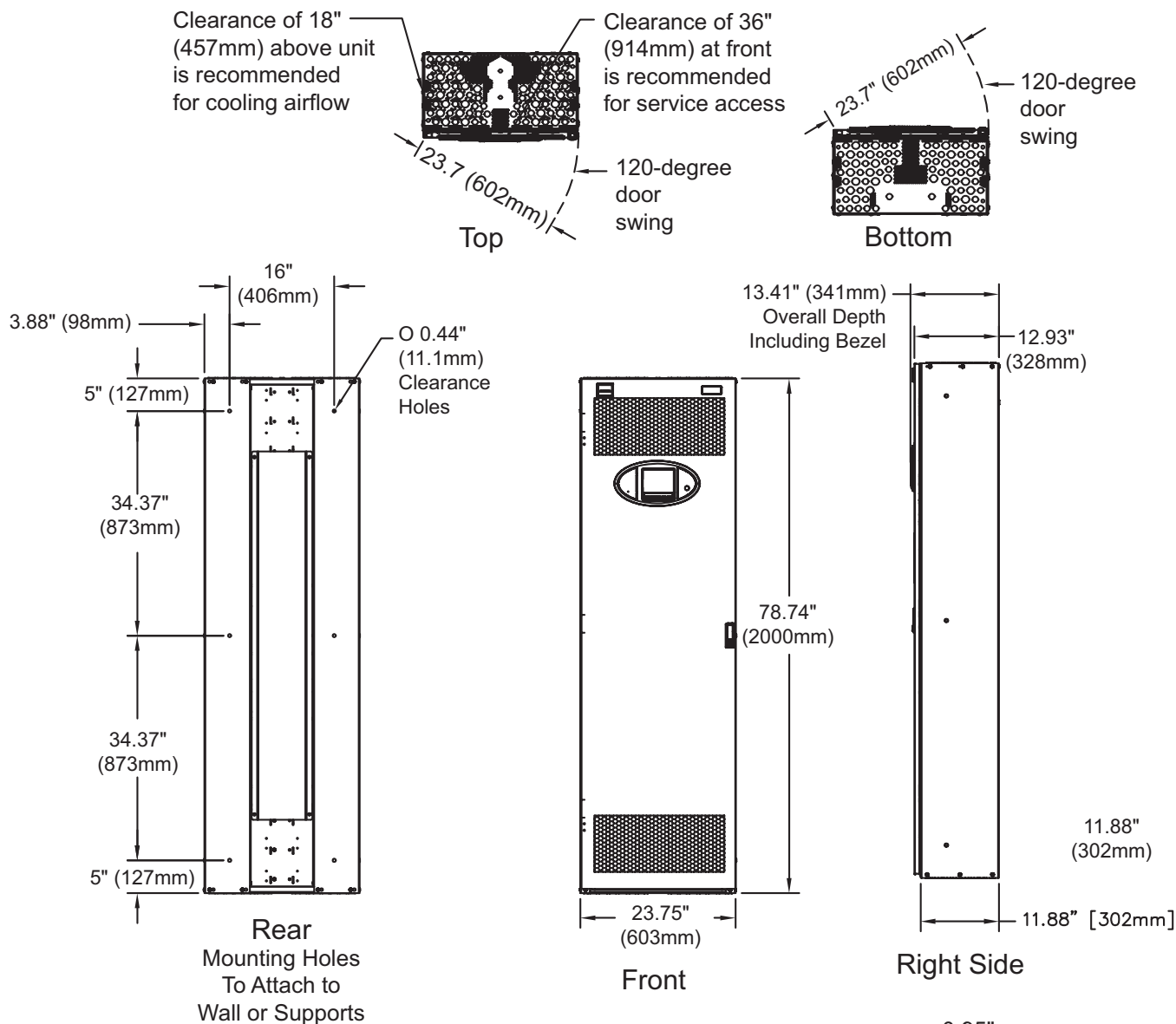
Plan the route—The route that the unit will follow to its installation area should be planned to ensure that all passages are large enough to accommodate the unit and that the floors are strong enough to support the weight. Check all doorways, hallways elevators, ramps and other portions of the route to determine if there are any obstructions and to ensure each is large enough and strong enough to allow easy passage.

Move with care—The Liebert RX should be moved to the installation area on the wooden pallet using forklift or pallet jack.

If any damage as a result of shipping is observed—Immediately file a damage claim with the shipping agency and forward a copy to:

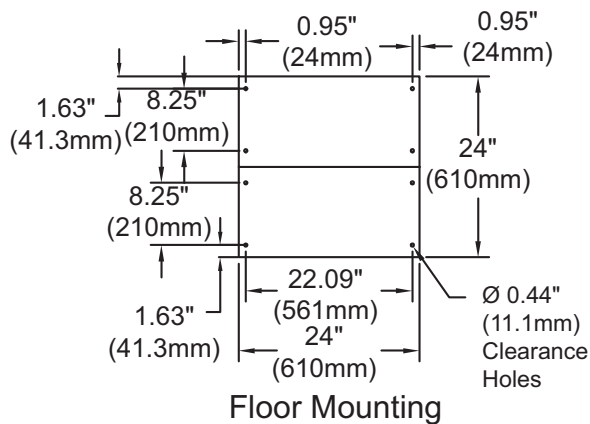
Liebert Corp.
1050 Dearborn Drive
P.O. Box 29186
Columbus, Ohio 43229 USA

Figure 1 Typical cabinet and floor planning dimension data



NOTES:

1. Weight—225lb. (102kg)
2. Heat Output—3412BTU/Hr (1kW)
3. Unit cannot be free-standing; it must be attached to a wall or other support; hardware supplied by others.
4. Units can be attached back-to-back, side-by-side (if attached to a wall or other support) or back-to-back with units on one or both sides. Hardware is included with each unit.
5. Shown with optional monitoring display.



RX11000
Rev. 1

1.3 Unit Preparation

The Liebert RX may be easily removed from the shipping pallet and installed by customer personnel. A typical procedure is as follows:

- Set the shipping pallet in a level area where there is enough room lift the Liebert RX off the pallet onto the raised floor.
- Remove front door.
- Unbolt the unit from the shipping pallet. There is a bolt in each of the four bottom corners.
- Use a lifting device or an appropriate number of personnel to lift the unit off the pallet and place it on the floor.



WARNING

Risk of heavy unit falling or tipping over. Can cause property damage, personal injury or death.

A single Liebert RX is not designed to be a free-standing unit and may present a tipping hazard. The Liebert RX must be properly supported and braced until it is securely attached to a supporting structure.



NOTE

Before maneuvering the unit into its final position, read and follow all advisories in 1.4 - Location Considerations

1.4 Location Considerations

The Liebert RX should be installed in the data center and close to the load(s) it is supplying.

Equipment location should employ the shortest output distribution cable runs consistent with logical equipment arrangement and allowances for additional equipment.

The Liebert RX should be installed in an environment with an ambient temperature range of 32°F to 104°F (0°C to 40°C) with a relative humidity of 0% to 95% (non-condensing).

Required clearance above the unit for cooling air flow is 18" (460 mm); clearance below for cables is 12" (305mm) minimum. Bottom clearance is required for exit of cables/conduits and for cooling airflow. This clearance is automatically provided by a raised floor with a minimum height of 12" (305mm).

Recommended minimum service clearances are shown in **1.5 - Configurations for Liebert RX Installation** and **Figures 2 and 3**. The indicated clearance at the front of the unit is required for service access by the National Electrical Code (NEC). Clearance above the unit is required for cooling airflow (exhaust).

As with all electrical devices, the Liebert RX produces heat under normal operation. The heat output is 3412 BTU/Hr (1 kWh). This heat output should be included when calculating the environmental conditions of the room.

1.5 Configurations for Liebert RX Installation

The Liebert RX can be installed in any of five configurations. Installation will vary depending on the chosen configuration.

- **Configuration 1**—Single unit
- **Configuration 2**—Two units attached back-to-back
- **Configuration 3**—Two units attached side-by-side
- **Configuration 4**—Three units: two attached back-to-back with the third attached to one side
- **Configuration 5**—Four units: two units attached back-to-back with one unit attached to each side

1.5.1 Configuration 1—Single Unit

This single-unit configuration is 24" (610mm) wide and 12" (305mm) deep. It must be secured to a wall, rack or other structure. The required front service access is:

- 36" (914 mm) for units up to 150V to ground
- 42" (1067 mm) for units over 150V to ground



WARNING

Risk of heavy unit falling or tipping over. Can cause property damage, personal injury or death.

The Liebert RX is not designed to be a free-standing unit in this configuration and may present a tipping hazard. The Liebert RX must be properly supported until it is securely attached to a supporting structure.

1.5.2 Configuration 2—Back-to-Back

This two-unit configuration is attached back-to-back and is 24" (610mm) wide and 24" (610mm) deep. The two units can be installed in place of a floor tile. Remove one 24" x 24" (610 x 610mm) floor tile and position the Liebert RX over the opening, the unit will rest on top of the raised floor cross members on all four sides. Refer to **Figure 2**.

1.5.3 Configuration 3—Side-By-Side

This two unit configuration is attached side-by-side and is 48" wide and 12" (305mm) deep. The units must be secured to a wall, rack or other structure. Refer to **Figure 2**.

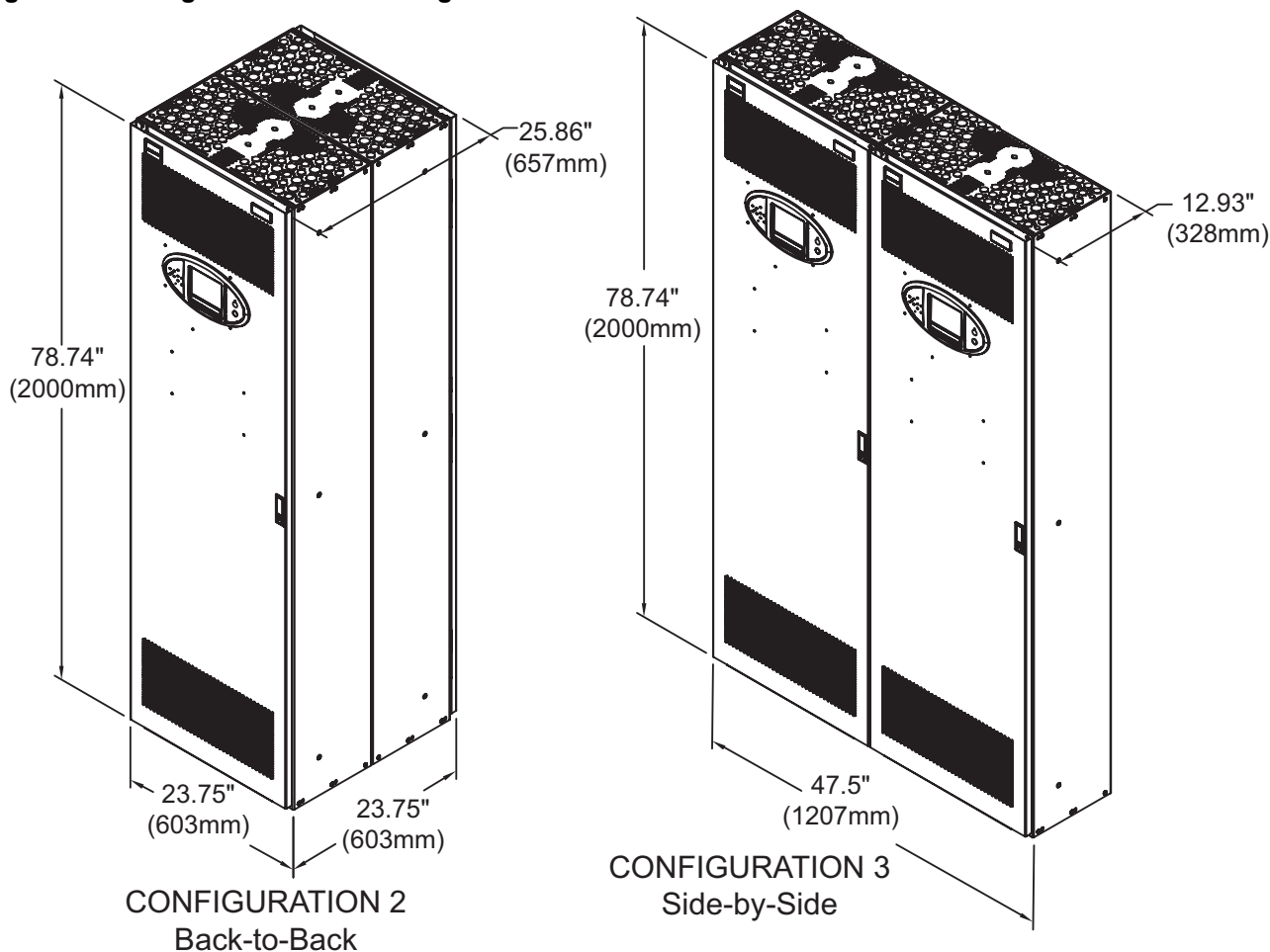


WARNING

Risk of heavy unit falling or tipping over. Can cause property damage, injury or death.

The Liebert RX is not designed to be a free-standing unit in this configuration and may present a tipping hazard. The Liebert RX must be properly supported until it is securely attached to a supporting structure.

Figure 2 Configuration 2 and Configuration 3—Two Liebert RX units



NOTES:

- Units are ordered and shipped separately. Units can be attached in the field as shown.
- Side-by-side units are not free-standing. They must be attached to a wall or other support. Mounting hardware supplied by others.
- Hardware to attach units to each other is factory-supplied.
- Shown with optional monitoring display.
- Configuration 2** requires front and rear service access.
- Configuration 3** requires front service access.
- Service access clearance dimensions:
36" (914mm) for units up to 150V to ground
42" (1067mm) for units over 150V to ground
- Clearance above the unit for cooling air flow: 18" (460 mm) minimum
- Clearance below for cables: 12" (305mm) minimum.

RX17000
Rev. 1

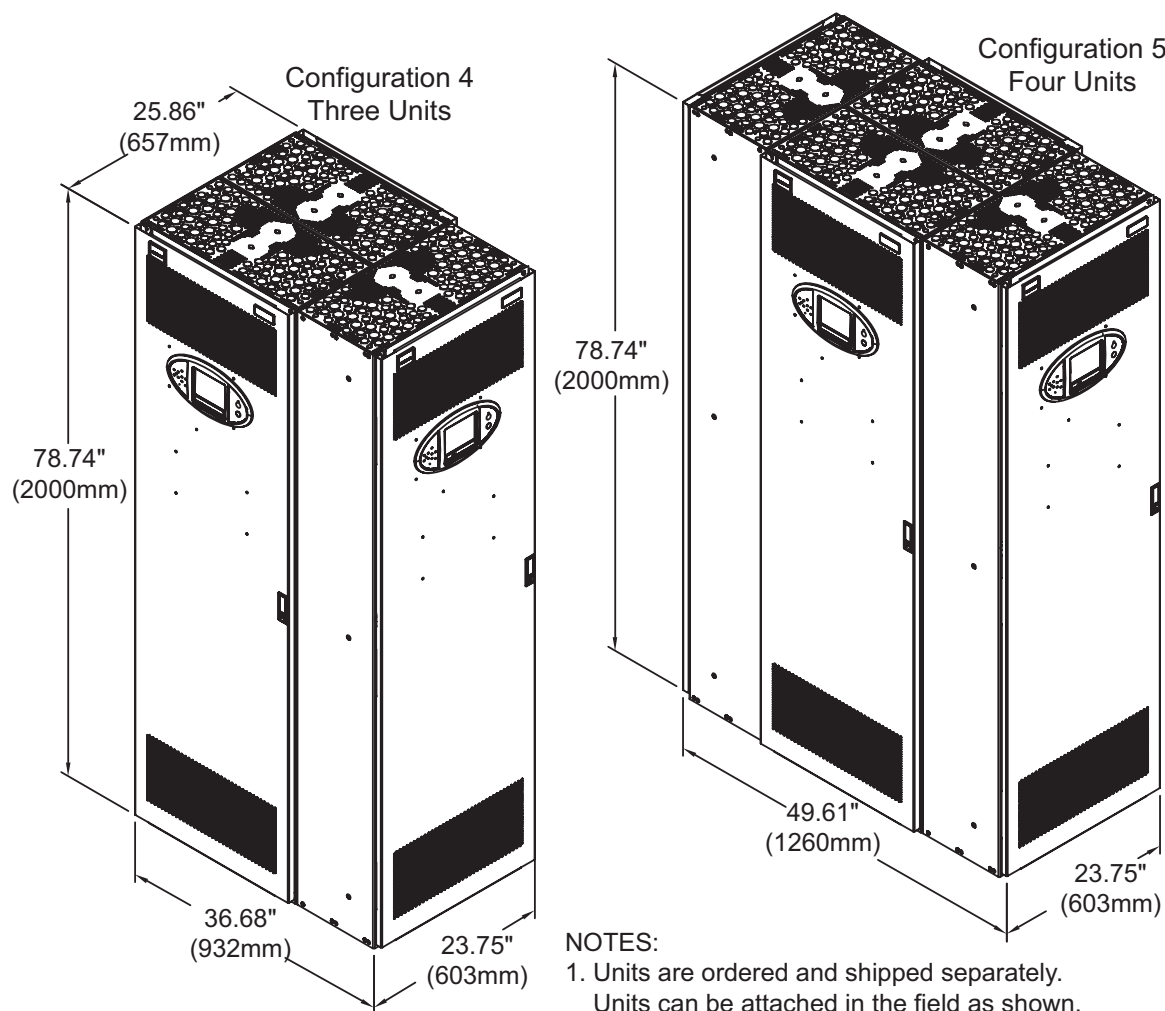
1.5.4 Configuration 4—Three Units

This three-unit configuration has two units attached back-to-back with a third unit attached to the side. It is 36" wide and 24" (610mm) deep. These units are free-standing and can be set on a raised floor. Refer to **Figure 3**.

1.5.5 Configuration 5—Four Units

This four-unit configuration has two units attached back-to-back with one unit attached to each side. It is 48" wide and 24" (610mm) deep. These units are free-standing and can be set on a raised floor. Refer to **Figure 3**.

Figure 3 Configuration 4—Three units and Configuration 5—Four units



NOTES:

1. Units are ordered and shipped separately. Units can be attached in the field as shown.
2. Hardware to attach units to each other is factory-supplied.
3. Shown with optional monitoring display.
4. **Configuration 4** requires front, rear and side service access.
5. **Configuration 5** requires front, rear and both side service access.
6. Service access clearance dimensions:
 - 36" (914mm) for units up to 150V to ground
 - 42" (1067mm) for units over 150V to ground
7. Clearance above the unit for cooling air flow: 18" (460 mm) minimum
8. Clearance below for cables : 12" (305mm) minimum.

1.6 Power Wiring

Power wiring should be installed by licensed electricians. All power wiring must comply with the NEC and applicable local codes.

1.6.1 Input Power Connections

Remove the front door. Open the accent panel, punch the top and/or bottom conduit tray to match the number and size of the input conduit(s) and attach the input feeder.

Input power cables should be connected to the input lugs located inside the unit. (See **Figures 4 and 5**) and the electrical field connection drawing supplied with the unit for details.)



WARNING

Risk of electric shock. Can cause personal injury or death.

Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.

Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

Follow all local codes.

To minimize disturbances caused by other loads in the building, the 3-phase power input to the unit should be supplied directly from a dedicated power source.

The input feeder circuit should be sized in accordance with the NEC and any local building codes to ensure the feeder's ability to safely carry the system's full load current, including losses.

Input feeder conductors should be sized for no more than 2% voltage drop. If operation at undervoltage conditions for extended periods of time is desired, the input feeders must be oversized.

The main input feeder must consist of 3-phase conductors, one neutral and one (safety) ground conductor (4W + G).

Figure 4 Input electrical field connection location for units with main panelboard breaker

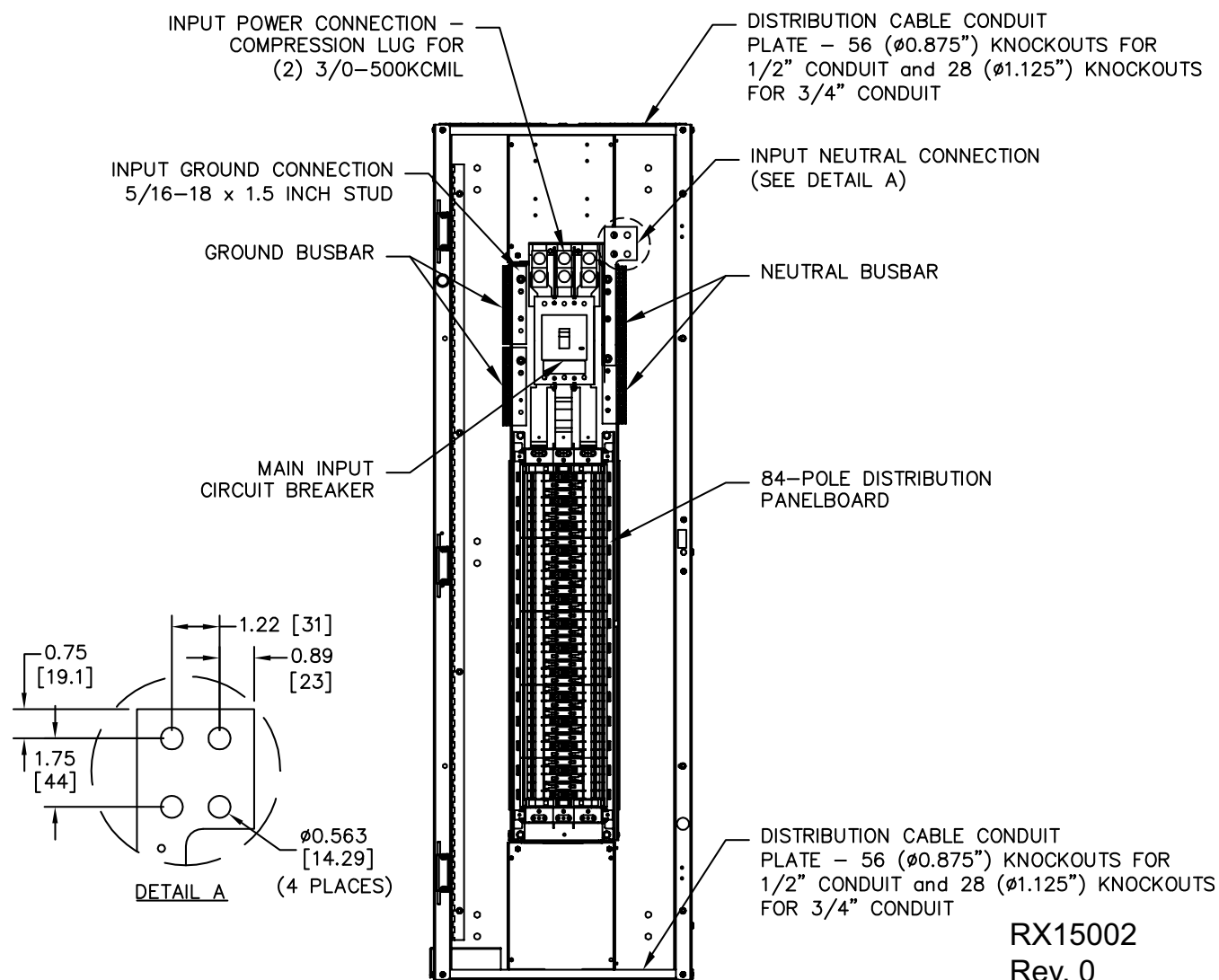


Figure 5 Input electrical field connection location for units without main panelboard breaker

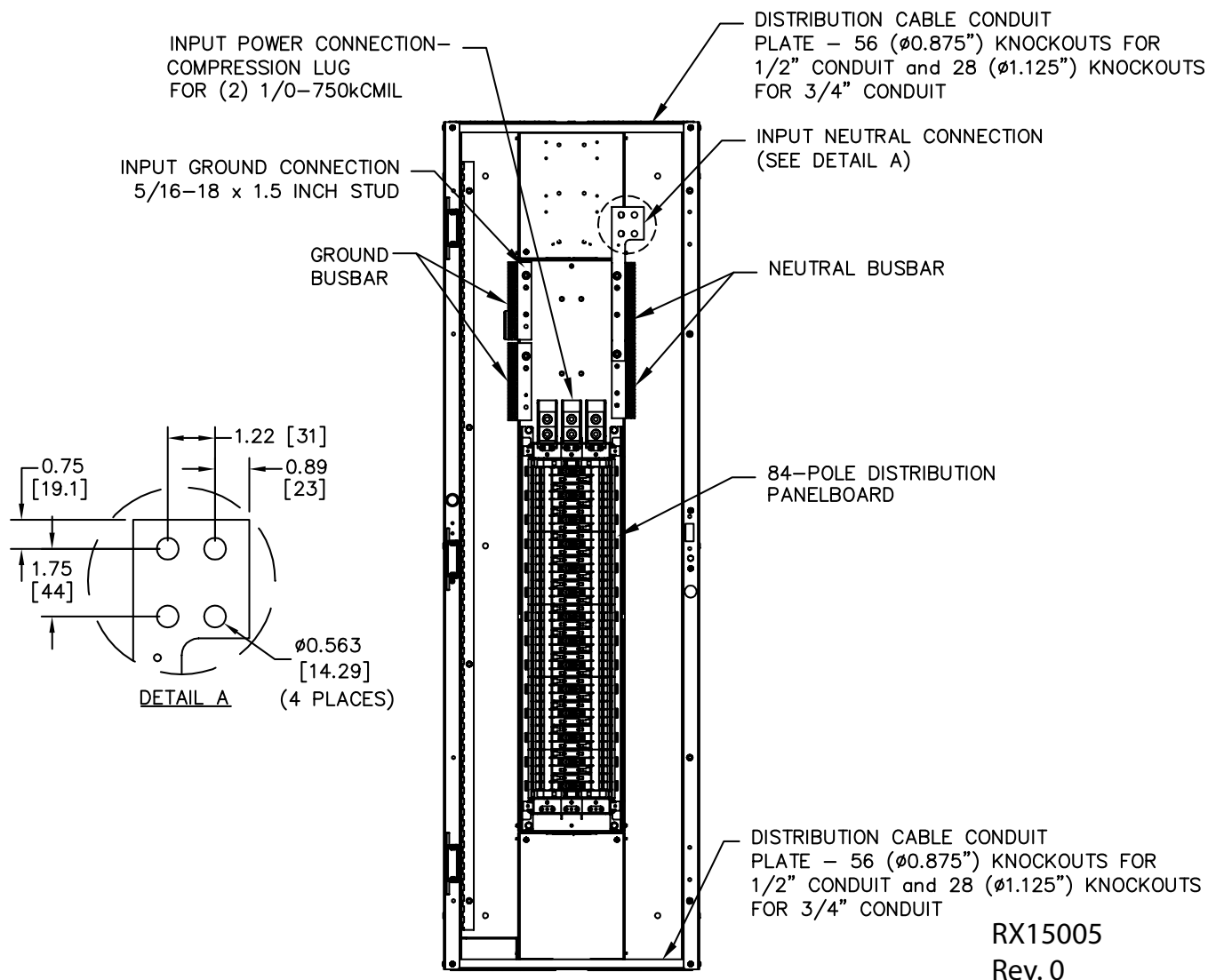


Figure 6 Electrical field connections for units with LDMF monitoring

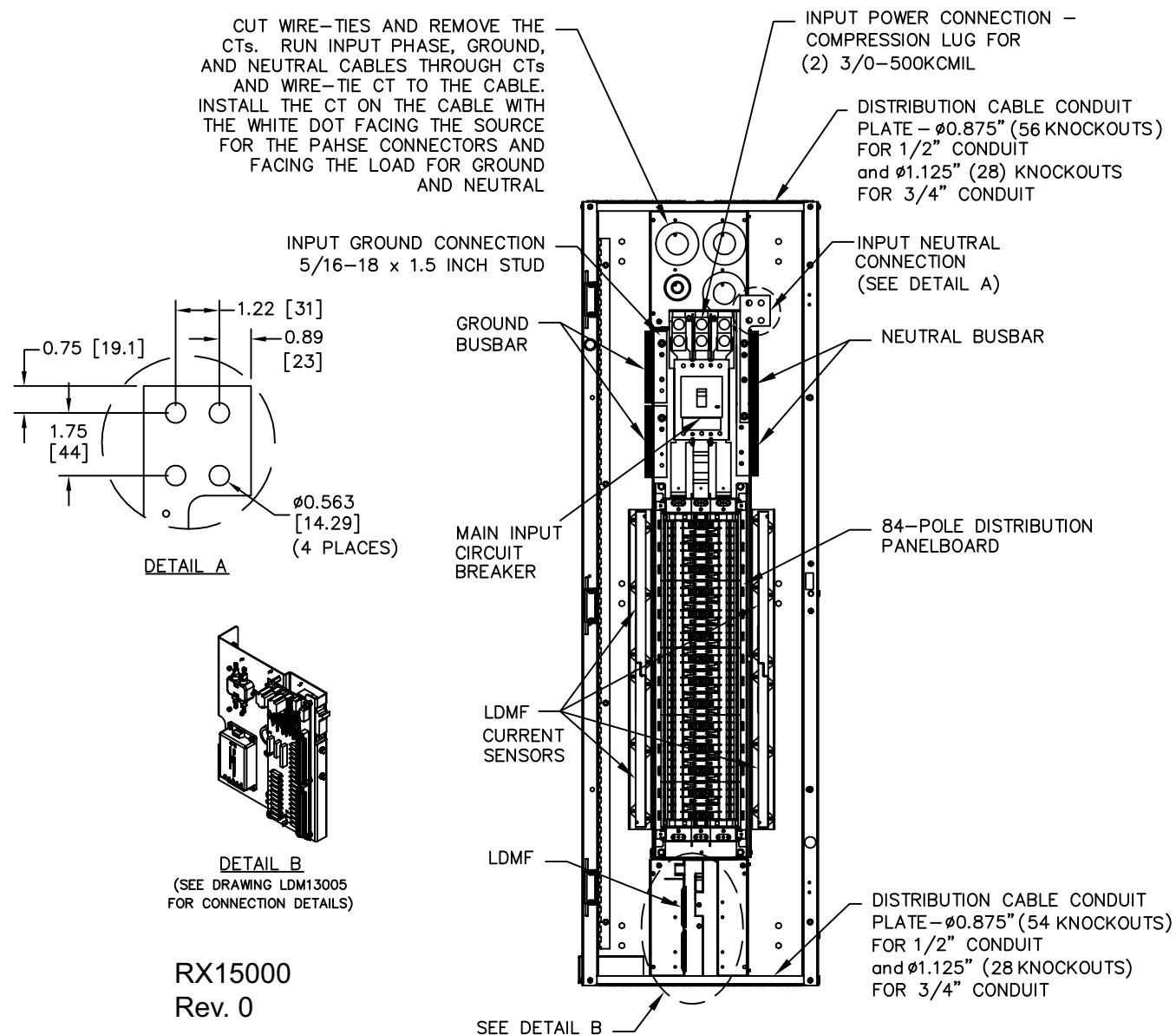


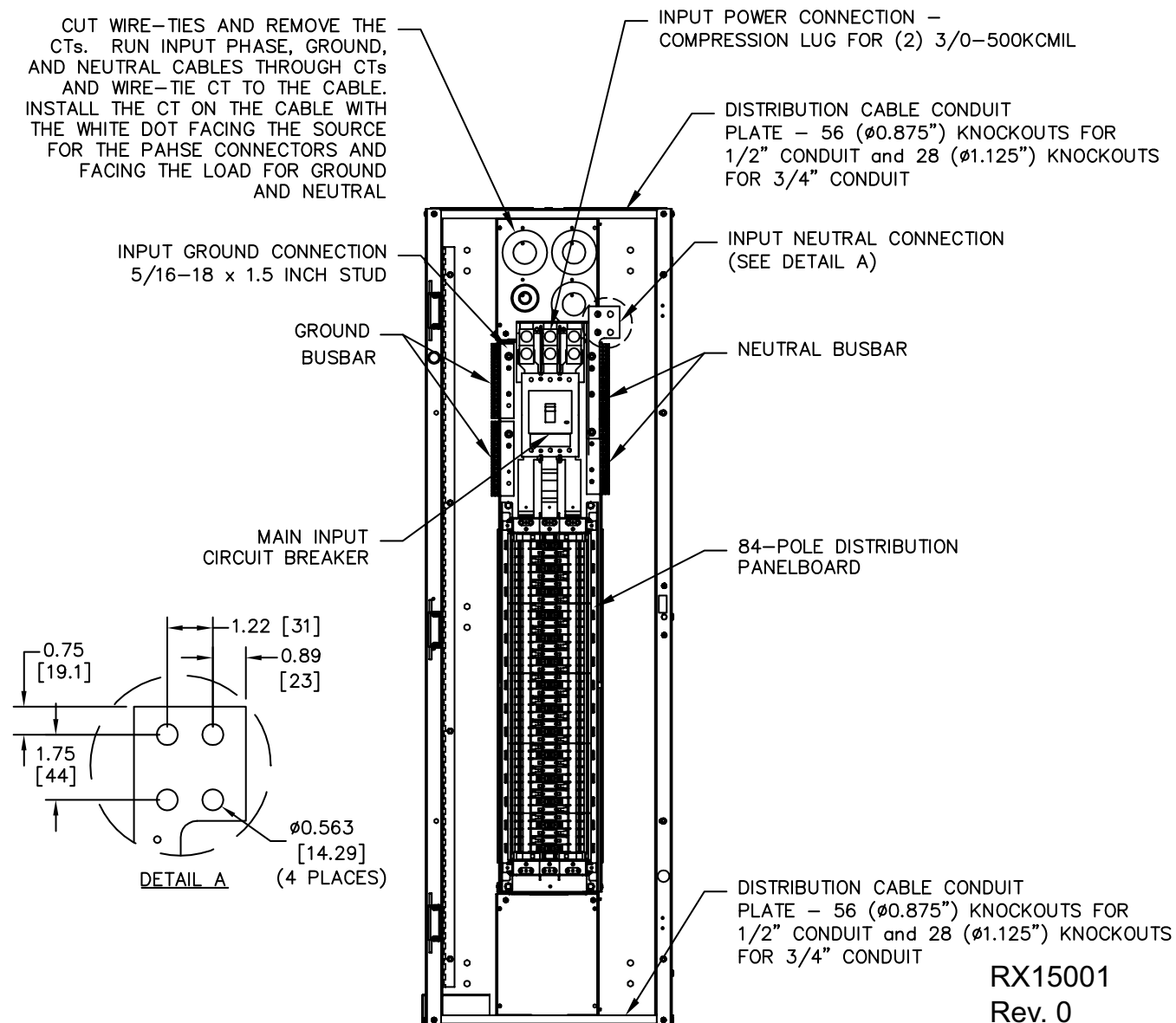
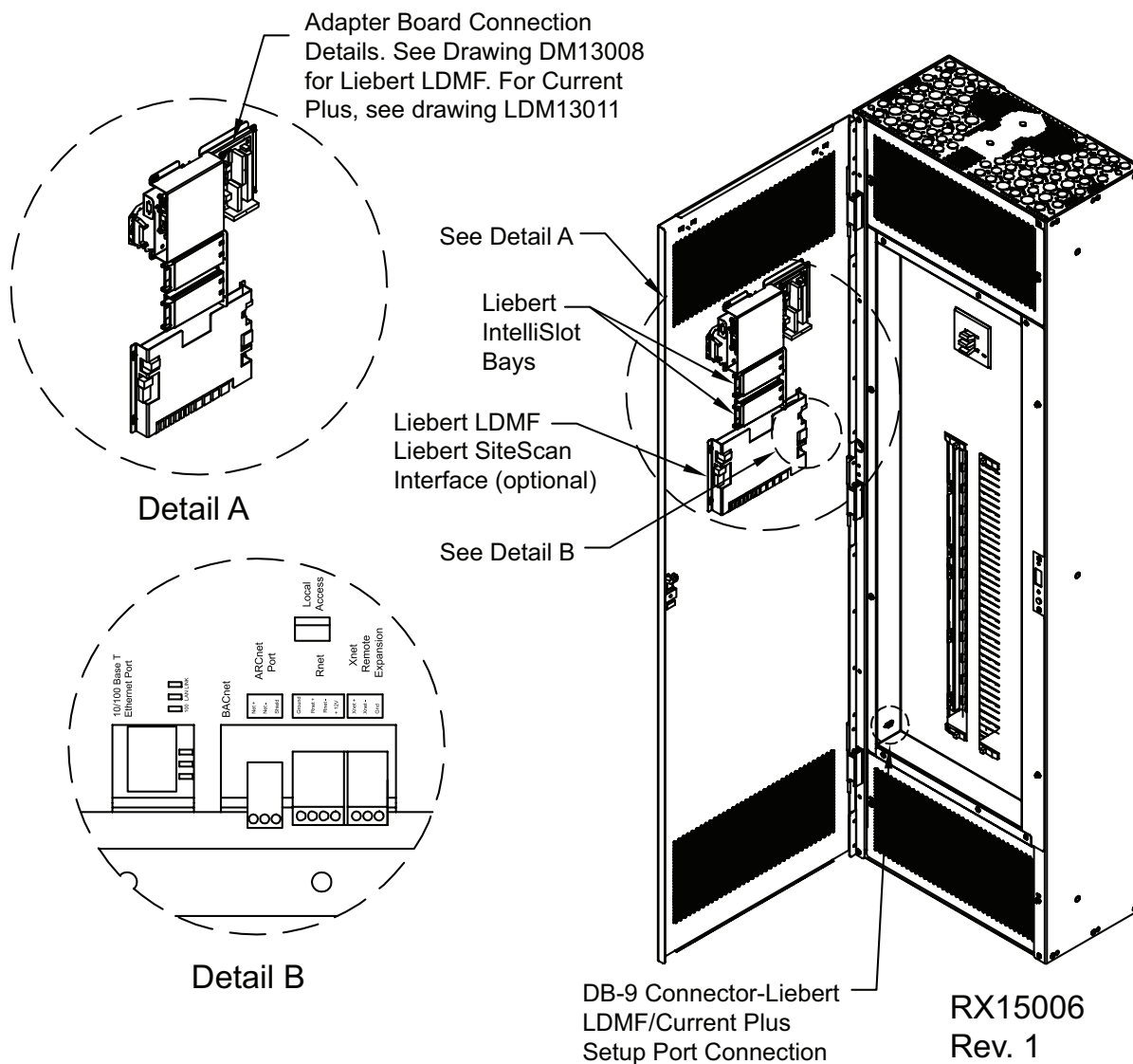
Figure 7 Electrical field connection for units with Current Plus Monitoring

Figure 8 Liebert LDMF™, Liebert SiteScan® and Liebert IntelliSlot® location and connection details



1.7 Output Power Connections

An output panelboard with ground and neutral provisions is provided inside the unit for connecting load(s) as required. (See **Figures 4, 5 and 6**).

Flexible output distribution cables are use in data processing areas under a raised floor. Cable lengths and layout should be well planned:

Cable routes should follow aisles between equipment. This will facilitate access to cables for installation, routine inspection and future changes.

Determine the required cable length by measuring the distance to the load equipment following right-angle paths, rather than diagonally or directly. Always measure to the extreme far side of the equipment with respect to the unit to insure adequate cable length.

Prevent restriction of airflow under the raised floor by running the flexible conduits flat on the sub-floor, in parallel paths.

Initial system output loading should be between 50% and 75% of rated capacity. This allows the addition of future loads without immediately investing in another Liebert RX.

Balancing of loads is good design practice on any 3-phase system.



WARNING

Risk of electric shock. Can cause personal injury or death.

Verify that all incoming line voltage (power) circuits are de-energized and locked out before installing cables or making connections in the unit.

Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

Follow all local codes.

All output cables and connections must comply with the NEC and all other applicable codes.

All output cables without receptacles that are hard-wired to the load equipment must be equipped with a padlock-off accessory for the output circuit breaker. The padlock-off accessory is used to lock out and tag the circuit breaker while service is performed on the hard-wired load equipment in accordance with OSHA safety rules.

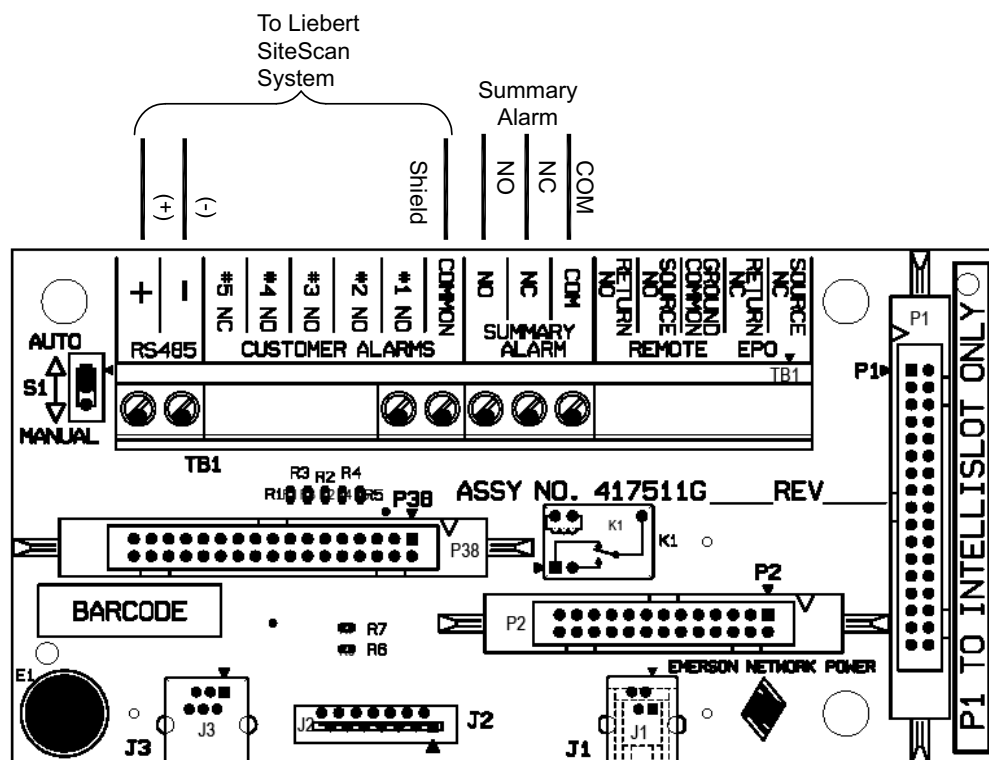
1.8 Current Plus Monitoring—Optional

If Current Plus Monitoring (CPM) is supplied, remote communications and summary alarm connections are available.

A Liebert IntelliSlot[®] card provides connect to a Building Management System (BMS) or Liebert SiteScan[®] monitoring interface. The following cards are available:

- IS-WEBS card—for SNMP/Web output to Ethernet LAN
- IS-485S card—for Modbus 485 output using a two-wire connection
- IS-IPBMS card—for Modbus IP output using an RJ-45 connection

Check Liebert IntelliSlot slots on the back of the door to determine which card is supplied, more than one card might be supplied. See **Figures 7 through 9** for location and connection details.

Figure 9 Current Plus Monitoring adapter board electrical field connections**NOTES:**

1. The summary alarm contacts are rated for 0 to 30VAC or VDC, 0.5A, 10 watts, maximum.
2. For Liebert SiteScan connection, use #22AWG shielded cable; maximum distance: 1000ft (300m).

LDM13011
Rev. 0

1.8.1 Summary Alarm

Current Plus Monitoring provides a Form C (one NO and one NC) summary alarm contact for remote alarm status. The summary alarm contacts change state upon occurrence of any alarm including warnings and reset when the alarm is cleared. The summary alarm connection is on the Adapter Board (see **Figure 8**, Detail A, and **Figure 11**) marked *Summary Alarm (NC) (NO) and (COMM)*. The contacts are rated at 24VAC at 1A.

1.9 Liebert LDMF™ Monitoring—Optional

If Liebert LDMF monitoring is supplied, remote communications and summary alarm connections are available.

A Liebert IntelliSlot® card provides connection to a Building Management System (BMS) or to Liebert SiteScan® monitoring interface. The following cards are available:

- IS-WEBS card—for SNMP/Web output to Ethernet LAN
- (IS-485S card—for Modbus 485 output using a two-wire connection
- IS-IPBMS card—for Modbus IP output using an RJ-45 connection

Check Liebert IntelliSlot slots on the back of the door to determine which card is supplied, more than one card might be supplied. See **Figures 7, 8 and 11** for location and connection details.

**WARNING**

Risk of electric shock. Can cause personal injury or death.

Verify that the panelboard voltage (power) circuit is de-energized and locked out before installing branch breakers and cables or making connections in the unit.

Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

Follow all local codes.

1.9.1 Replacing a CT in the CT Module

In the unlikely event a CT in the CT Module should fail, up to six replacement CTs may be installed using a split core CT kit, available separately from your local Emerson representative.

1. Verify that the branch breaker is Off and power is de-energized.
2. Route wiring from the transformer through the panel to the control board.
3. Connect the CT connector to the proper panel location using the first available connection. See **Figure 10** for details:
 - a. For panelboard A use P2 (A1), P3 (A2), P4 (A3).
 - b. For panelboard B use P5 (B1), P6 (B2), P7 (B3).Ensure all routed wiring is properly secured to the panel with tie wraps.
4. The top piece of the current transformer (CT) is removable by pulling away from the center of the transformer (**Figure 10**, Item 2).
5. Place the main body of the current transformer around the cable, making sure the CT is installed in the direction shown in **Figure 10**, Item 2.
6. Replace the top piece of the CT to complete securing the CT around the cable (**Figure 10**, Item 3), then use the enclosed tie wraps to secure the CT to the cable.

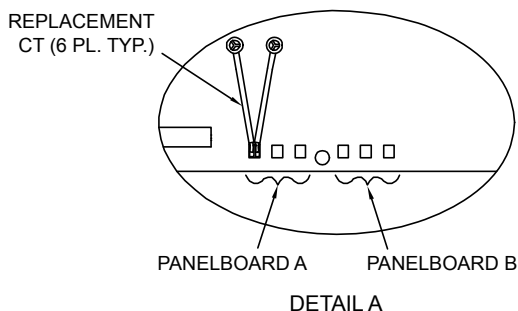
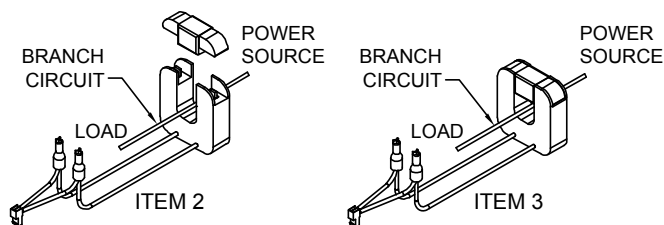
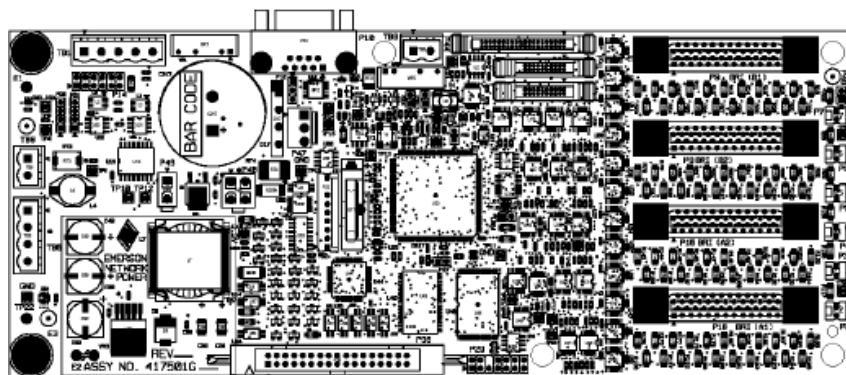


WARNING

Risk of electric shock. Can cause personal injury or death.

Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup. Do not open circuit the secondary windings of current transformers. Failure to follow these instructions may result in serious injury or death.

Figure 10 Electrical field connections for CT Module replacement CTs



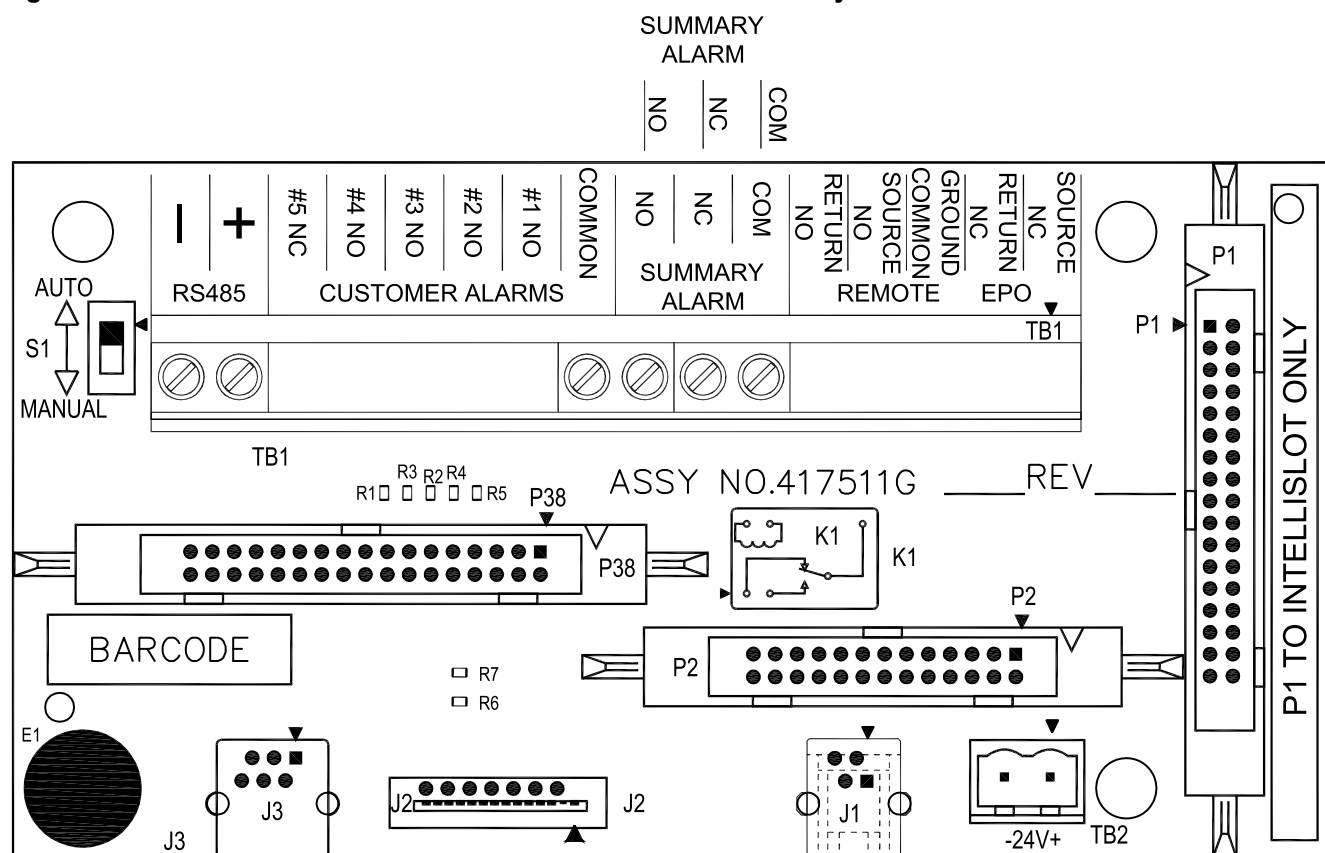
NOTES:

1. REMOVE CT FROM THE BOX. ROUTE WIRING FROM THE TRANSFORMER THROUGH THE PANEL TO THE LDM CONTROL BOARD.
2. CONNECT THE CT CONNECTOR TO THE PROPER PANEL LOCATION USING THE FIRST AVAILABLE CONNECTION:
 - A. FOR PANELBOARD A USE P2(A1), P3(A2), P4(A3)
 - B. FOR PANELBOARD B USE P5(B1), P6(B2), P7(B3)
 ENSURE ALL ROUTED WIRING IS PROPERLY SECURED TO THE PANEL WITH TIE WRAPS.
3. THE TOP PIECE OF THE CURRENT TRANSFORMER (CT) IS REMOVABLE BY PULLING AWAY FROM THE CENTER OF THE TRANSFORMER (ITEM 2).
4. PLACE THE MAIN BODY OF THE CURRENT TRANSFORMER AROUND THE CABLE, MAKING SURE THE CT IS INSTALLED IN THE DIRECTION SHOWN (SEE ITEM 2).
5. REPLACE THE TOP PIECE OF THE CT TO COMPLETE SECURING THE CT AROUND THE CABLE (SEE ITEM 3). USE THE ENCLOSED TIE WRAPS TO SECURE THE CT TO THE CABLE.

* WARNING: DO NOT OPEN CIRCUIT THE SECONDARY WINDINGS OF CURRENT TRANSFORMERS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH.

LDM13004
Rev. 0

Figure 11 Electrical field connections for Liebert LDMF™ summary alarm



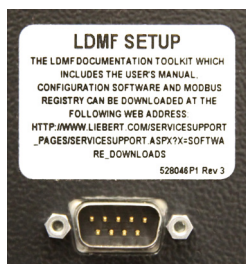
LDM13008
Rev. 0

1.10 Liebert LDMF Communication

Connecting locally to the Liebert LDMF Monitoring option requires a female-to-female (F-F) DB9 null modem cable. There will be an external port on the Liebert RX labeled LDMF SETUP. Connect the DB9 null modem cable to a local PC. Once connected you may run any of the provided software tools that can be downloaded from the Liebert Web site, www.liebert.com (see the Liebert LDMF user manual, SL-20200, for details on downloading and using the software).

1.10.1 LDMF Setup Port Connection

The local LDMF Setup port is **not** intended to be a service terminal or hyperterminal connection. It is intended only for use of the Liebert LDMF software tools provided.



NOTE
Also refer to Figure 8.



NOTE

The images above are intended for illustration only. The location of the external port may vary.

**NOTE**

Before making any changes to an existing configuration or uploading a file to another Liebert LDMF™ system, make a note of the Software Address. When overwriting an existing configuration file due to changes, modifications or breaker addition/deletion, the Software Address will revert to the value of the file that is loaded. This can lead to incorrect Software Addresses causing Modbus communication errors.

1.10.2 Liebert SiteScan® Web Monitoring Interface

The optional monitoring interface module allows the Liebert LDMF to communicate with Liebert SiteScan Web 4.0 or greater. The option includes software and graphics that support up to 168 branch breakers using an Ethernet connection. The monitoring interface is on the back of the Liebert RX front door and has connections for RJ-45 Ethernet and BACnet. See **Figure 8** for location and wiring details.

1.10.3 Summary Alarm

The Liebert LDMF provides a Form C (one NO and one NC) summary alarm contact for remote alarm status. The summary alarm contacts change state upon occurrence of any alarm including warnings and reset when the alarm is cleared. The summary alarm connection is on the Adapter Board (see **Figure 8**, Detail A, and **Figure 11**) marked *Summary Alarm (NC) (NO)* and *(COMM)*. The contacts are rated at 24VAC at 1A.

2.0 EQUIPMENT INSPECTION AND STARTUP

2.1 Internal Inspection

A detailed internal inspection should be performed after the unit is in place and before it is energized, to ensure trouble-free startup. The same internal inspection should be carried out when performing preventive maintenance.



WARNING

Risk of electric shock. Can cause personal injury or death.

Verify that all incoming power circuits are de-energized and locked out before performing the internal inspection.

Gain access to the internal components of the Liebert RX by opening the accent panel.

Inspect the wiring and components to be sure they are not damaged.

Check all power connections for tightness. Refer to **Table 1** for torque requirements of all electrical connections

Follow the procedures described in **3.0 - Inspection and Startup Checklist** when performing a detailed inspection.

Table 1 Maximum wire range recommended torque values

Terminal	Connector Max. Wire Range	Torque, in/lb
Main Lug	No. 3/0-500 MCM Copper	275
Ground Main	No. 6-250 MCM Cu	200
Ground Neutral Bar		
1/4" Holes (No. 14-4 AWG) 5/16" Holes (No. 14-2 AWG)	No. 14-10 Copper	20
	No. 8 Copper	25
	No. 6-4 Copper	35
	No. 2 Copper	50
Connector Mounting Hardware		
1/2"-13 Bolt and Nut	—	480
QOB Breaker Connector Screw	—	18-21

See branch breaker for lug torque.

2.2 Startup

Follow the detailed step-by-step checklist in **3.0 - Inspection and Startup Checklist** when installing and starting up the Liebert RX.

A qualified electrician should be employed to perform the equipment inspection and startup. System startup may be arranged by calling your local Emerson Network Power sales representative or Emerson Network Power® Liebert Services. In the USA, call **1-800-543-2378**.

A copy of the appropriate checklist (furnished with the equipment) must be completed, signed, dated and returned to Emerson Network Power. **Warranty coverage of the equipment is not effective unless the Checklist is received by the factory.**



WARNING

Risk of improper startup. Can cause equipment damage, personal injury and death.

Hazardous voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup.

Equipment inspection and startup should be performed only by properly trained and qualified personnel wearing appropriate safety headgear, gloves and shoes.

3.0 INSPECTION AND STARTUP CHECKLIST

Unit Serial Number: _____
 Unit Model Number: _____
 Date: _____

3.1 Inspection



WARNING

Risk of electric shock. Can cause personal injury or death.

Lethal voltages are present during startup procedures. Electrical safety precautions must be followed throughout inspection and startup. Verify that all incoming power circuits are de-energized and locked out before performing any internal inspection.

Exterior Inspection

- ___ 1. Confirm that the exterior of unit is undamaged.
- ___ 2. Confirm that service and ventilation clearances are adequate. (See **1.5 - Configurations for Liebert RX Installation**).

Interior Inspection

- ___ 1. Open the accent panel.
- ___ 2. Inspect all wire and conductor insulation for damage.
- ___ 3. Check all breaker connections for tightness. Retorque if necessary.
- ___ 4. Check all terminal block connections for tightness. Retorque if necessary.
- ___ 5. Remove any foreign objects from the components or the interior area of the unit.
- ___ 6. Check that the intake and exhaust air screens are clean and free of obstructions.
- ___ 7. Close the accent panel, leaving access to circuit breakers for the following startup procedure.

3.2 Startup



WARNING

Risk of electric shock. Can cause personal injury or death.

Hazardous voltages are present in the equipment throughout the startup procedure. This unit has several circuits that are energized with high AC voltage.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in starting this unit. When performing any procedure with any part of the equipment under power, personnel and test equipment should be standing on rubber mats.

In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires.

One person should never work alone, even if all power is disconnected from the equipment. A second person should be standing by to assist and to summon help in case of an accident.

- ___ 1. Make certain that all circuit breakers are in the Off position and that power to the unit is locked out.
- ___ 2. Turn On the building power to the unit. Check the phase rotation at the panelboard main breaker or panelboard input lugs if no panelboard main breaker is supplied. Phase rotation should be A, B, C, as indicated.
- ___ 3. Check and record the input voltages at the panelboard main breaker or panelboard input lugs if no panelboard main breaker is supplied:

	Input 1	Input 2	Input 3	Input 4
Volts, phase A to phase B =	_____	_____	_____	_____
Volts, phase B to phase C =	_____	_____	_____	_____
Volts, phase C to phase A =	_____	_____	_____	_____

- ___ 4. Turn Off and lock out the building power to the unit.
- ___ 5. Replace the junction box cover.
- ___ 6. Verify proper input power connections to unit, including equipment grounding conductor.
- ___ 7. Turn On the building input power to the unit.
- ___ 8. Check the phase rotation at the panelboard main breaker. Phase rotation should be A, B, C, left to right.
- ___ 9. Check and record the input voltage at the panelboard main breaker. Measured voltages should correspond to the unit's nameplate input voltage.

	Panelboard 1			
Volts, phase A to phase B =	_____	_____	_____	_____
Volts, phase B to phase C =	_____	_____	_____	_____
Volts, phase C to phase A =	_____	_____	_____	_____

If output voltage is incorrect, check for wiring errors or incorrect input voltage. Contact Emerson Network Power Liebert Services at **1-800-543-2378** in the USA or the local factory representative for assistance.

- ___ 10. Turn On the panelboard main breaker.

3.3 Monitoring System Check Out

If the unit is equipped with Current Plus Monitoring or Liebert LDMF™:

1. Turn the unit ON.
2. Ensure that the LCD is on. The Monitor Panel displays output and neutral currents for the panelboard (load must be applied to get an accurate reading).

4.0 OPERATING INSTRUCTIONS

4.1 Startup Procedures

Before the unit is placed in service after initial installation, after equipment relocation or after equipment has been de-energized for an extended period of time, perform equipment inspection and startup procedures as detailed in **2.0 - Equipment Inspection and Startup** and in **3.0 - Inspection and Startup Checklist**.

After initial system startup, the following guidelines can be used for standard equipment operation. These guidelines should be reviewed for any special equipment modifications, special site considerations or company policies that may require changes to the standard equipment operation.

4.2 Normal System Shutdown

To perform a normal system shutdown, perform an orderly load equipment shutdown according to the load equipment manufacturer's recommended shutdown sequence. The load equipment can be turned OFF at each piece of load equipment or at the Liebert RX panelboards (circuit breaker) located behind the unit's front door. Turn OFF the unit panelboard main breaker. To remove all power from the unit, turn OFF the building power to the unit.

4.3 Normal System Turn ON

Make certain all unit circuit breakers are in the OFF position. All unit circuit breakers are located behind the front door. Turn ON building power to the unit. Turn ON the panelboard main circuit breakers if supplied. If the circuit breaker has been tripped OFF (instead of being turned OFF), the circuit breaker handle must be moved to the OFF position before being turned ON. Individually turn ON each panelboard circuit breaker following the load equipment manufacturer's startup sequence.

4.4 Current Plus Monitoring—Optional

The Liebert RX has a Current Plus Monitoring (CPM) feature that monitors the current and voltage of the panelboard. The CPM includes a monochrome liquid crystal display (LCD) with power and alarm LEDs, an audible alarm and a Silence push button.

The CPM displays the power parameters and alarms listed below for each panelboard.

The CPM displays circuit identification, the status of each breaker and the following parameters:

- Voltage—Line-to-Line
- Voltage—Line-to-Neutral
- Neutral Current
- Ground Current
- kVA
- Power Factor
- Voltage Total Harmonic Distortion (THD)
- Current Total Harmonic Distortion (THD)
- Crest Factor

The CPM annunciates alarm messages for the following conditions. Alarm thresholds for monitored parameters are adjustable through the service port to match site requirements. The alarms and their factory setpoints for the alarms are:

Alarm	Default Setpoint
• Overvoltage	A line-to-line voltage is more than 6% above nominal
• Undervoltage	A line-to-line or line-to-neutral voltage is 13% below nominal
• Neutral Overcurrent	Current exceeds 95% of breaker amps
• Ground Overcurrent	Current exceeds 5 amps
• Phase Overcurrent Warning	Current exceeds 75% of breaker amps
• Phase Overcurrent	Current exceeds 80% of breaker amps
• Summary Alarm	

Summary Alarm—detects and annunciates upon occurrence of any alarm.

Summary Alarm Contacts—The CPM has a Form C (1 NO and 1 NC) summary alarm contacts for remote alarm status. The contacts are rated at 24VAC @ 1A. The contacts change state when any alarm or warning occurs and reset when the alarm is cleared.

To facilitate troubleshooting, all alarms are stored in non-volatile memory to protect against erasure by a power outage. Alarms must be manually reset after alarm conditions are corrected.

Communication—Remote communication and summary alarm connections are available.

A Liebert IntelliSlot[®] card provides connection to a Building Management System (BMS) or to Liebert SiteScan[®] monitoring using RS485, see **Figure 9**. The following cards are available:

- IS-WEBS card—for SNMP/Web output to Ethernet LAN
- (IS-485S card—for Modbus 485 output using a two-wire connection
- IS-IPBMS card—for Modbus IP output using an RJ-45 connection

Check Liebert IntelliSlot slots on the back of the door to determine which card is supplied; more than one card might be supplied. for See **Figures 7, 8 and 12** for location and connection details.



WARNING

Risk of electric shock. Can cause personal injury or death.

Verify that the panelboard voltage (power) circuit is de-energized and locked out before installing branch breakers and cables.

4.5 Liebert LDMF™—Optional

If the Liebert RX is equipped with the optional Liebert LDMF, the monitoring unit is On whenever power is supplied to the unit. The Liebert LDMF is factory-configured for 1-pole, 20A branch breakers. Alarms, alarm setpoints, circuit breaker names and circuit breaker ratings are all field-adjustable through the DB9 connector (**LDMF SETUP** port; see **Figure 8**).

For more information, refer to **1.10 - Liebert LDMF Communication** for communication options and connections and the Liebert LDMF user manual (SL-20200).

The Liebert LDMF local display allows users to view monitoring information for the panelboard as well as each individual branch circuit breaker. Alarm data can be viewed from the local display for up-to-date breaker status.

Figure 12 Liebert LDMF local display



5.0 MAINTENANCE

5.1 Repair

Even the most reliable equipment may fail. Liebert Services is at your service to assure fast repair of your unit and minimum down-time of your installation.



WARNING

Risk of electric shock. May cause personal injury or death.

Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Liebert RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.

Standard electrical troubleshooting procedures should be used to isolate problems in the unit. If there are questions, don't hesitate to contact Liebert Services.

Repair or replacement of standard items, such as circuit breakers and fuses can be either handled by qualified electricians or referred to Liebert Services.

Repairs related to the monitoring system should be referred to Liebert Services.

To contact Liebert Services for information or repair service in the USA, call 1-800-543-2378.

5.2 Inspection & Cleaning

Air circulation through the cabinet may cause dust to accumulate on internal components. Cleaning should be done as necessary during electrical inspections.

Annual general system inspections, cleaning and operation checks are recommended to ensure system performance and long service life.



WARNING

Risk of electric shock. May cause personal injury or death.

Only properly trained and qualified service personnel wearing appropriate safety headgear, gloves, shoes and glasses should perform maintenance on the Liebert RX. All voltage sources to the unit must be disconnected before inspecting or cleaning within the cabinet.

5.2.1 Inspection Schedule

- It is difficult to establish a schedule for periodic cleaning because conditions vary from site to site. Inspections after the first 24 hours, after 30 days and after 6 months of operation should help determine a pattern for the inspection schedule.
- Electrical connections and component mountings should be inspected after the first 24 hours, after 30 days and after 6 months of operation. Inspections should be conducted annually thereafter.
- Ventilation openings and grilles should be inspected and cleaned every 6 months to one year.
- A complete inspection and operational checkout should be performed annually. This is best done by performing the inspection and startup procedure as detailed in **3.0 - Inspection and Startup Checklist**.
- Liebert Services offers a complete range of preventive maintenance services. These include thorough equipment performance checks and calibration of electronics. Contact Liebert Services in the USA (**1-800-543-2378**) for details.

Technical Support / Service

Web Site

www.liebert.com

Monitoring

liebert.monitoring@emerson.com

800-222-5877

Outside North America: +00800 1155 4499

Single-Phase UPS & Server Cabinets

liebert.upstech@emerson.com

800-222-5877

Outside North America: +00800 1155 4499

Three-Phase UPS & Power Systems

800-543-2378

Outside North America: 614-841-6598

Environmental Systems

800-543-2778

Outside the United States: 614-888-0246

Locations

United States

1050 Dearborn Drive

P.O. Box 29186

Columbus, OH 43229

Europe

Via Leonardo Da Vinci 8

Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

+39 049 9719 111

Fax: +39 049 5841 257

Asia

29/F, The Orient Square Building

F. Ortigas Jr. Road, Ortigas Center

Pasig City 1605

Philippines

+63 2 687 6615

Fax: +63 2 730 9572

While every precaution has been taken to ensure the accuracy and completeness of this literature, Liebert Corporation assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

© 2014 Liebert Corporation

All rights reserved throughout the world. Specifications subject to change without notice.

® Liebert is a registered trademark of Liebert Corporation.

All names referred to are trademarks or registered trademarks of their respective owners.

SL-20501_REV3_08-14

Emerson Network Power

Liebert

www.emerson.com